images, which in a certain measure approached red; for making the paint the flowers were boiled in water with alkali and the juice expressed and strained. Hernandez figured the xochipalli plant and in the figure Safford recognised *C. sulphureus:* then he took the juice of flowers of *C. sulphureus,* and found that alkali does intensify the colour. It is now desirable that some one should ascertain if the sulphur-coloured *C. sulphureus* is a race deficient in alkali or deficient in dye. Either is possible: and interesting experiments in genetics suggest themselves.

No writer has as yet recorded that *C. sulphureus* is used for dyeing in the East; and if, as Merrill suggests, the Spaniards at a relatively late date introduced it into the Philippines, probably, just as the British did in India, they took it as an ornamental plant, its tinctorial uses being entirely forgotten. It was otherwise with *C. caudatus.* That species the Spaniards carried across the Pacific because it served on board ship as a vegetable. They carried it, just as they carried *Amaranthus spinosus* and *Opuntia monacantha.* The last named is no longer eaten; but the Amaranth is; and under the name " ulam rajah " the Malays eat the *Cosmos.*

I. H. Burkill.

CEDRELA IN THE MALAY PENINSULA.

Upon two occasions, and two only, mature Cedrela has been collected in the Malay Peninsula. Both were in 1886. In January of that year Sir George King's collector, Herman Kunstler, found a fruiting tree (his 10403) in a locality recorded as Ulu Bubong,—an unidentified valley apparently not far from the village of Kerling in north-eastern Selangor: and in May Charles Curtis obtained specimens of a flowering tree (his 826) upon Government Hill, Penang.

Kunstler's label states that his tree was 100 ft. high with a trunk 2–3 feet in diameter and with spreading branches. It stood in dense mixed forest at 400—600 feet above sea-level. Curtis' label gives the locality of his tree as close to the bungalow on Government hill at 2,500 feet, above sea-level; and the tree was 70—80 feet high, very large and spreading.

Gamble (Man. Ind. Timbers, 1922, p. 158) records that the average height of trees of a plantation of *Cedrela toona* in Assam 22 years old was 63 feet; and as Cedrelas grow fast it is not necessary to allow a greater age than 50 years to those which Kunstler and Curtis found.

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Both specimens were referred to *C. febrifuga,* Blume, by King (Journ. As. Soc. Bengal, 64–2, 1895, p. 89) and Mr. Ridley has followed him (Flora Mal. Penins. 1, 1922, p. 415). But Casimir de Candolle in 1908 determined Curtis 826, (as represented in the herbarium of the Royal Botanic Gardens, Calcutta—namely by a specimen examined by King.) to be *C. toona,* var. *pilistaminea* (Rec. Bot. Survey, Ind., 3, 1908, p. 366). In the same publication he quoted King as authority for the occurrence of *C. febrifuga* in Penang; that is to say he inadvertently called Curtis' specimen by both names.

There are four species of Cedrela which so occur in nature that to find them alive in Malaya would not be a matter of surprise.

They are:—

Cedrela toona, Roxburgh ex Rottler in Ges. Naturforsch. Freunde. Neue Scriften, 4, 1803, p. 198 (little more than the name) and Plantae Coromand., 3, 1819, p. 34.

Cedrela sureni: Swietenia sureni, Blume, Cat. Gewassen Buitenzorg, 1823, p. 72: *Cedrela febrifuga,* Blume, Bijdrage, 4, 1825, p. 180.

Cedrela sinensis, A. L. de Jussieu in Mem. Mus. Paris, 19, 1830, p. 255.

Cedrela serrata, Royle, Illustr. Flora Himalaya, 1839, p. 44, pl. 25.

C. toona is the very valuable Toon tree of the forests of India. It is found in the Himalaya up to 4,000 feet, and southwards in the hills of the Peninsula, on the one hand, and on the other through Chittagong to Burma and to the hills in the north of Siam, south of which in a wild state it ceases apparently to grow, but re-appears in northern Australia in a curious way.

C. serrata is another Himalaya tree, growing up to 800 feet and extending to Manipur and northern Burma.

C. sinensis is a highly valued tree of China, which is wild in the hilly provinces, and exploited for timber, while cultivated elsewhere and often then pollarded because the Chinese eat the tender shoots. Rehder and Wilson (in Sargent's Plantae Wilsonianae, 2, 1914, p. 156) state that in woodlands it is a tall straight tree with a narrow head.

Valeton, Hochreutiner and some others have reduced *C. serrata* and *C. sinensis* to one species; but the differences are sufficient to separate them either varietally or specifically.

C. sureni is common throughout Java from sea-level to 4,500 feet, and less abundant upwards to 6,000 feet (Koorders, Excursionsflora Java, 2, 1912, p. 437). It seems to occur also in Sumatra and in Indo-China. Formerly the Philippine *C. calantas* (Toona calantas, Rolfe and Merr.)

was united to it, but on account of larger fruits is now separated: while certain equally large fruited Assam plants remain united to it, but perhaps not logically. These in their seeds, curiously winged at both ends, differ strikingly from the species mentioned earlier. Equally they are valuable timber.

Man by planting has extended the natural range of all four; for instance *C. serrata* is very common in Java not only by European agency but in native holdings; and *C. toona* occurs.

A word must be said upon the occurrence of the last in Java. Hiern (in Hooker's Flora of Brit. Ind. I, 1875, p. 568) credited it to the island: but others have thought that he did so mistaking *C. sureni* for it. This was not so; for Hiern had access to a specimen of *C. toona* collected in Java by Horsfield between 1802 and 1819 and to another collected by Spanoghe who was there for some time prior to 1834. Both men has marked leanings toward economic botany and interested themselves in cultivated plants. Their *C. toona* was doubtless cultivated and Hiern was wrong only in thinking it wild.

C. toona was much experimented with in the Straits Settlements by Cantley during the years 1880 and 1888 when he was in charge of the Botanic Gardens, Singapore, and planted in several places. Undoubtedly it will grow in the Peninsula.

Examination of Curtis 826 confirms Casimir de Candolle's determination. It is *C. toona.* And the situation in which Curtis found it gives as complete support as we shall ever get to the view expressed by Mr. Ridley that it is an introduction. But some European probably introduced it in the thirties or forties of the last century, not a Tamil.

Examination of Kunstler 10403 shows it to be *C. sureni* and the situation indicates that it was wild. Therefore the Malay Peninsula is within the natural distributional area of this valuable tree.

The record under *Cedrela* in the Flora of the Malay Peninsula has to be divided into two: the introduced Penang plant is to be recorded under *C. toona;* the rest is to remain as a native tree but by the laws of priority in nomenclature the combination *Cedrela sureni* is to be substituted for *C. febrifuga.*

An immediate duty is to seek in Selangor and elsewhere for more of the valuable tree. My duty in the end of this note is to thank Mr. C. C. Calder, Director of the Botanic Survey of India, for the kindness that he did in giving me information regarding specimens preserved in the Royal Botanic Gardens, Calcutta.

I. H. Burkill.